

Attachment 4

Method and program of personal preparation assessment test

The candidates are required to answer a multiple choice test which comprises 30 questions; for each question a single answer is due, to be selected from a set of three possibilities where only one is the correct solution. The time for the test is established by the Test Commission. The test is considered as passed if at least 20 correct answers are given.

The contents of the questions are defined by the following list of topics:

Basic .background. for Engineering

- Basic mathematical expressions for engineers
- Physics a
- Chemistry
- Informatics

Circuit Theory

- Ohm and Kirchhoff laws for electric circuits
- Thevenin and Norton theorem
- Circuits with resistors, inductors and capacitors
- Superposition theorem

Electrical Measurements and instrumentation

- Units of measure
- Instantaneous, average and r.m.s value of a physical quantity
- Active, reactive and apparent power
- Measure of industrial quantities

Electrical Machines and Drives

- Transformer: basic laws and equivalent circuit
- Expression of the electromagnetic torque for different kinds of electrical actuators (d.c. machine, induction motor)
- Induction machine: equivalent circuit; electrical and mechanical power, losses, torque, speed
- Synchronous machine: steady-state equivalent circuits

Electric Power Systems

- Voltage drop in industrial power networks
- Power factor correction of an electric load
- Short circuits calculations for both symmetric and non-symmetric faults
- Cable sizing

Automatica

- State-space representation of linear systems: basic properties and stability analysis
- Linearization of a nonlinear system around an equilibrium
- Transfer function: definition and properties
- Step response of first and second order linear systems
- Frequency response: definition and properties
- Bode plots and their asymptotic approximations
- Block diagrams: definition and transformations. Structure of a control system.
- Stability of closed-loop systems: Bode stability criterion and characteristic equation
- Sensitivity and complementary sensitivity functions: definitions and properties
- Performance analysis of closed-loop systems

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